



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/697,518	10/30/2003	Bruno Hans Haider	134766	8149

41838 7590 01/17/2007
GENERAL ELECTRIC COMPANY (PCPI)
C/O FLETCHER YODER
P. O. BOX 692289
HOUSTON, TX 77269-2289

EXAMINER	
KHOLDEBARIN, IMAN K	
ART UNIT	PAPER NUMBER
3709	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/17/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/697,518

Applicant(s)

HAIDER ET AL.

Examiner

I Kenneth Kholdebarin

Art Unit

3709

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) 3, 9-12, 15-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4,5-8, 13-14, 21-27 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>10/30/2003 and 11/24/2006</u> . | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Election / Restriction

1. This application contains claims directed to the following patentably distinct species:

Species A. Fig. 4, drawn to transducer probe with low voltage multiplexer.

Species B. Fig. 5, drawn to transducer probe with high voltage multiplexer.

Species C. Fig. 6, drawn to transducer probe without multiplexer.

The species are independent or distinct because of different type of multiplexer being claimed in the invention.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, claim 1, 2 and 6-8, 21-27 are generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which depend from or otherwise require all the limitations of an allowable generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Art Unit: 3709

2. During a telephone conversation with Mrs. Jean Testa (Reg. No. 39396) on December 20, 2006 a provisional election was made without traverse to prosecute the invention of method and apparatus for transducer probe, species A directed to claims 1, 2, 4-8, 13-14 and 21-27.

Affirmation of this election must be made by applicant in replying to this Office action. Claims 3, 9-12, 15-20 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

3. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 21 and 24-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Chiang (US 5,590,658).

Art Unit: 3709

Re Claim 1: Chiang discloses a probe / scan head (12) with plurality of transducers (18), and a plurality of pulsars / pulse synchronized circuitry (22) responsive to one or more transmit timing signals received from an external system to transmit pulses to said plurality of transducers (See Fig. 3 and 4, Col. 9, line 17-30).

Re Claim 21, 24 and 25: Chiang discloses a method for generating signals in an external system / data processor (14) and controlling a plurality of pulsers (22) in a probe utilizing the one or more signals from the external system and operating a plurality of transducers (18) utilizing signals from the pulser. Generating timing signals in handle of the probe (pulser 22 is a synchronizer) and having the external system as an imaging system (10) and the transducer to be ultrasound transducer (See Fig. 4, Col. 5, line 10-45).

Re Claim 26: Chiang discloses a method for operating a transducer probe (18) generating one or more signals in the probe / driver circuitry (20) (See Col. 9, line 26-31), controlling(38) a plurality of pulsers (22) in the probe, and operating a plurality of transducers utilizing signals from the plurality of pulsers (Fig. 5, Col. 10, line 50- Col. 11 line 5, Col.10 line 16-19).

Re Claim 27: Chiang discloses a method for sending control signals / beamformer (26) from the probe to an external system (14), (See Fig. 7, Col. 12, line 55-65).

Art Unit: 3709

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –
(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

7. Claims 1, 2 and 8 are rejected under 35 U.S.C. 102 (e) as being anticipated by Leavitt (US 6,540,682).

Re Claim 1: Leavitt discloses a probe (106) with plurality of transducers (204), and a plurality of pulsers (336) responsive to one or more transmit timing signals received from an external system to transmit pulses to said plurality of transducers (See Col. 3, line 53-55, Col. 4, line 21-23 and line 43-46).

Re Claim 2: Leavitt discloses a probe wherein plurality of pulsar(s) is responsive to a low voltage analog transmit timing signal (See Col. 4, line 66- Col. 5, line 1).

Re Claim 8: Leavitt discloses a probe with transducers is ultrasound transducers (204-1-n) and the pulsers (336) are responsive to one or more transmit timing signals from an imaging system (See Col. 4, line 25-55).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 4, 5, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leavitt.

Re Claim 4 and 5: Although Leavitt fails to specifically disclose a low voltage multiplexer to couple transmit timing signals and the transducer (204) is responsive to a dedicated pulser (336), Leavitt clearly discusses the low voltage transmit timing signal via connection (332) to drive the pulsers (Fig. 3 and Col.5 line 1-5).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have a low voltage multiplexer to distribute the low voltage signals of transmit timing to each pulser in order to improve the speed of signal distribution and making the each transducer be responsive to a dedicated pulser in an imaging system (100).

Re Claim 13 and 14: Although Leavitt fails to disclose the low voltage multiplexer to be used with plurality of transducers (204-1-n), (Leavitt mentions in Col. 4 line 22-23 that these transducers are ultrasonic transducers), and an array of pulsers (336)

Art Unit: 3709

to control signal from an external system and configured to distribute signals to array of pulser (336) in order to generate pulses for transducers (204), Leavitt clearly discusses that the input signal generated from the outside system is a low voltage (Col. 4 line 66- Col.5 line 5).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have a low voltage multiplexer to replace the connection (332) for the purpose of distribution the low voltage signals of transmit timing from the image system (100) to each pulser in order to pulsers generate signal to be transferred to dedicates transducer (204-1-n).

10. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chiang in view of Little (US 5,893,363). The teachings of Chiang have been discussed above.

Re Claim 6: However, Chiang fails to disclose or fairly suggest pulsers to be bipolar, unipolar or combination of both and a conversion to set the timing signal to operate with low voltage pulsers.

Little teaches the drive signals for unipolar pulsers (202) to each terminal of pulser as well as the complementary waveforms applied when bipolar signals are used (See Fig.5, Col. 5, lines 2-10).

Therefore, in view of Little, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the pulsers of Chiang with the bipolar and unipolar pulsers in order to make both B-mode and Doppler imaging of the ultrasound machine possible.

Re Claim 7: However, Chiang fails to disclose or fairly suggest a digital to analog converter in handle, to transmit timing signals.

Art Unit: 3709

Little teaches the digital analog converter (338) used in handle to convert the transmit signals to analog format for the use of pulser (See Fig. 6, Col. 7, lines 45-50).

Therefore, in view of Little, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the direct connection of Chiang with the DAC device in order to produce the signal digital format but transmit them in analog format for more precise processing.

11. Claim 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chiang. Re Claim 22: Although Chiang fails to disclose or fairly suggest signals from the external system to comprising timing signals, Chiang mentions the pulsers (22-1-n) to synchronize the signal to be send to transducer (18-1-n).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have timing signals as an input for the pulsers (22-1-n), in order to keep the steady frequency on transmitting signal towards each transducer in an imaging system.

Re Claim 23: Although, Chiang fails to specifically disclose the method of plurality of transducers utilizing signals from the plurality of pulsers to operate each transducer by a dedicated pulser, but Chiang shows in Fig. 5 that every individual transducer (18-1-n) is in contact with the dedicated pulsers (22-1-n) through a high voltage driver, therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have plurality of transducers utilizing signals from the plurality of pulsers to operate, in order to

Art Unit: 3709

control the frequency of transmitted signal to the object and making the use of each transducer by being responsive to only one pulser at the time.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicants disclosure. Ogle discloses Hand held ultrasonic diagnostic instrument with digital beamformer; Suzuki discloses Delta signal modulator circuit for an analog to digital converter; Engeler discloses Ultrasound imaging system having spatial filtering preprocessor; Finger discloses Ultrasonic system and method for processing data; Fidel discloses Ultrasonic imaging device, system and method of use; Noujaim discloses Phased array ultrasonic beam forming using oversampled A/D converters.


13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to I Kenneth Kholdebarin whose telephone number is 571-270-1347. The examiner can normally be reached on M-F, from 8:00 am to 4 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jong-Suk (James) Lee can be reached on 571-272-7044. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 3709

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

IKK
12/28/2006


JONG SUK LEE
SUPERVISORY PATENT EXAMINER